REMARKS

Claims 22-42 are all the claims pending in the application. Claims 1-21, which are now cancelled without prejudice or disclaimer, stand rejected on prior art grounds. Claims 22-42 are added herein. Applicants respectfully traverse the rejections based on the following discussion.

I. The Prior Art Rejections

Claims 1-21 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Salonidis, et al. (U.S. Patent No. 6,865,371 B2), hereinafter referred to as "Salonidis" in view of Johansson, et al. (U.S. Publication No. 2002/0044549 A1), hereinafter referred to as "Johansson", and in further view of Shah, et al. ("Power-Based Leader Selection in AD-HOC Wireless Networks," 1999, IEEE, pp. 134-139), hereinafter referred to as "Shah". Applicants respectfully traverse these rejections based on the following discussion.

Johansson teaches two logically separated scatternets, the maximum connectivity scatternet (MCS) and the traffic scatternet (TS). An MCS maintains information about all nodes in the scatternet in order to facilitate a quick path establishment when a destination node is searched for. The MCS is maintained autonomously as new nodes arrive to the scatternet and other nodes leave the scatternet. A TS is established on a per session basis, primarily between two nodes in the scatternet. The TS is designed to achieve the best possible performance for the data flow between the involved nodes. When supported, in addition to establishing dedicated TS piconets and/or dedicated TS links, this may involve switching to the Bluetooth high speed mode on TS links. An overall scatternet may consist of one MCS and several TSs.

Salonidis teaches a method for connecting two or more devices via a wireless

communication channel is provided. In one embodiment, a method of connecting a first device to a second device includes the steps of arbitrarily assigning one of two possible states to each device, wherein in a first state, a device seeks to establish a connection with another device, and in a second state, the device renders itself available for connection with the other device; and alternating a present state of each device between the first state and the second state in accordance with a predefined probability distribution until either a predetermined timeout period has expired or a connection between the devices has been established, the length of time that each device remains in the first and second states being controlled by the probability distribution. In a second embodiment, a method of forming a scatternet between a plurality of devices or nodes in an ad hoc wireless communication network is provided.

Shah teaches a physical layer-based framework for the organization of an ad-hoc wireless network. The focus is quasi-static environments, such as multimedia classrooms, and situations characterized by real-time services and high traffic loads. In these cases, centralized control may be preferable due to its simplicity and high efficiency. Using a link loss matrix, an approach is proposed for selection of a network leader that takes into consideration link losses and transmitter powers. Both minimax and minisum criteria are developed to determine uplink, downlink, and overall leaders. A QoS-based iterative algorithm for determination of link transmit powers is also proposed, from which leader selection is obtained as a special case. Numerical results are also presented which explore the effect of quantization of feedback information on the interactive algorithm.

However, the claimed invention, as provided in newly added independent claims 22, 30, and 38 contain features, which are patentably distinguishable from the prior art references of

record. Specifically, claims 22 and 30 recite, "[a] method for optimal clustering of master-slave ad-hoc wireless network, said method comprising modeling all nodes in said wireless network in a star-shaped graphical format; assigning a weight to said all nodes, wherein said weight is a function of defined optimization parameters comprising an amount of neighbor nodes of each said node, a power consumption of said node, and a maintenance overhead associated with said node; assigning any of master and slave status to each node and connecting slave nodes in said wireless network to master nodes in said wireless network to form subgroups comprising a bounded size; interconnecting said subgroups through non-center nodes in said wireless network to form a single cluster using any of connecting a slave node at the boundary of one subgroup to the master of an adjacent subgroup; connecting two adjacent master nodes together; and converting a slave node at said boundary to a master node and linking the converted node to any of slave nodes and master nodes in adjacent subgroups; updating said weight of said all nodes at each occurrence of a removal of an edge of each node marked as any of said master node and said slave node; and minimizing the number of master nodes in said wireless network by the interconnection of said subgroups based on said defined optimization parameters."

Similarly, newly added independent claim 38 recites, "[a] method for optimal clustering of master-slave ad-hoc wireless network, said method comprising modeling all nodes in said wireless network in a star-shaped graphical format; assigning a weight to said all nodes, wherein said weight is a function of defined optimization parameters comprising an amount of neighbor nodes of each said node, a power consumption of said node, and a maintenance overhead associated with said node; assigning any of master and slave status to each node and connecting slave nodes in said wireless network to master nodes in said wireless network to form subgroups

comprising a bounded size; interconnecting said subgroups through non-center nodes in said wireless network to form a single cluster using any of connecting a slave node at the boundary of one subgroup to the master of an adjacent subgroup; connecting two adjacent master nodes together; and converting a slave node at said boundary to a master node and linking the converted node to any of slave nodes and master nodes in adjacent subgroups; updating said weight of said all nodes at each occurrence of a removal of an edge of each node marked as any of said master node and said slave node; minimizing the number of master nodes in said wireless network by the interconnection of said subgroups based on said defined optimization parameters; and minimizing the number of communication hops in said wireless network based on the minimal number of master nodes in said wireless network, wherein a formation of said subgroups and said interconnection between said subgroups is based on said weight associated with said each node in said wireless network, wherein said weight of said each node depends upon said amount of neighbor nodes, and wherein the minimizing processes are applied to the formation of a scatternet in a Bluetooth network."

Because Salonidis presents a method of connecting mobile devices to form an ad-hoc network (such as a scatternet), this inherently requires assigning master roles and slave roles to devices within the network, for the network to function correctly. A master has to perform certain overhead (coordination) responsibilities, which is a cost for the device. Therefore, there is a limit to how many slaves a master (an individual device) can serve. From an ad-hoc network's perspective, too many masters in the network are inefficient, because this slows things down, and many nodes are unnecessarily incurring overheads. However, the goal of the embodiments herein is to minimize the number of masters in the network. This is an

optimization problem, which is quite different from the formation problem addressed by Salonidis and requires different techniques and technologies than the formation of the ad-hoc network. The fact that one can create an ad-hoc network tells us nothing about how to optimize (minimize) the number of masters for the network. Conversely, the embodiments herein minimize the number of masters in an ad-hoc network so that the overheads for an ad-hoc network to function properly are minimized.

Furthermore, as stipulated in Graham v. John Deere Co., 383 U.S. 1, 86 S.Ct. 684, 15 L.Ed.2d 545, U.S.P.Q. 459 (1966), which provides the correct factual inquiries which establish a background for determining obviousness under 35 U.S.C. §103(a), one of these factual inquiries which determine obviousness is determining what the level is of one of ordinary skill in the art. Here, the level of one of ordinary skill in the art is that of an engineer who works in network architecture design and development. Accordingly, such an individual would not find the claimed invention obvious in light of the combination of Johansson, Salonidis, and Shah given the requirement of having to separate individually complete technologies in order to try and piece together a new device/method as provided in the application, thereby indicating that the claimed invention is unobvious in light of the collective prior art.

Insofar as references may be combined to teach a particular invention, and the proposed combination of Johansson, Salonidis, and Shah case law establishes that, before any prior-art references may be validly combined for use in a prior-art 35 U.S.C. § 103(a) rejection, the individual references themselves or corresponding prior art must suggest that they be combined. The Office Action fails to indicate where in either Johansson or Salonidis or Shah or in any other prior art it is taught or suggested that such a motivation to combine (as suggested by the Office

Action) exists and how such a combination could logically occur. Absent such a showing, the rejection is improper.

For example, in In re Sernaker, 217 USPQ 1, 6 (C.A.F.C. 1983), the court stated: "[P]rior art references in combination do not make an invention obvious unless something in the prior art references would suggest the advantage to be derived from combining their teachings." Furthermore, the court in Uniroyal, Inc. v. Rudkin-Wiley Corp., 5 USPQ 2d 1434 (C.A.F.C. 1988), stated, "[w]here prior-art references require selective combination by the court to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself. . . . Something in the prior art must suggest the desirability and thus the obviousness of making the combination."

In the present application, the reason given to support the proposed combination is improper, and is not sufficient to selectively and gratuitously substitute parts of one reference for a part of another reference in order to try to meet, but failing nonetheless, the Applicants' novel claimed invention. Furthermore, the claimed invention, as amended, meets the above-cited tests for obviousness by including embodiments such as assigning master or slave status to each node and connecting slave nodes to master nodes to form subgroups based on defined optimization parameters comprising an amount of neighbor nodes of each said node, a power consumption of said node, and maintenance overhead associated with the node and minimizing the number of master nodes in the wireless network. As such, all of the claims of this application are, therefore, clearly in condition for allowance, and it is respectfully requested that the Examiner pass these claims to allowance and issue.

As declared by the Federal Circuit:

> In proceedings before the U.S. Patent and Trademark Office, the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art. The Examiner can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. In re Fritch, 23 USPQ 2d 1780, 1783 (Fed. Cir. 1992) citing In re Fine, 5 USPQ 2d 1596, 1598 (Fed. Cir. 1988).

Here, the Examiner has not met the burden of establishing a prima facie case of obviousness. It is clear that, not only does Johansson and Salonidis fail to disclose all of the elements (as admitted on pages 3-5 of the Office Action) of the claims of the present invention, but also, if combined with Shah fails to disclose these elements as well. The unique elements of the claimed invention are clearly an advance over the prior art.

The Federal Circuit also went on to state:

> The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. . . . Here the Examiner relied upon hindsight to arrive at the determination of obviousness. It is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. Fritch at 1784-85, citing In re Gordon, 221 USPQ 1125, 1127 (Fed. Cir. 1984).

Here, there is no suggestion that Johansson, alone or in combination with Salonidis and Shah teaches a method and computer program product containing all of the limitations of the claimed invention. Consequently, there is absent the "suggestion" or "objective teaching" that would have to be made before there could be established the legally requisite "prima facie case of obviousness."

In view of the foregoing, the Applicants respectfully submit that it would be illogical and

unreasonable to assume one of ordinary skill in the art would be motivated to combine all of the cited prior art references, and in particular, Johansson and Salonidis and Shah together to teach the features defined by newly added independent claims 22, 30, and 38 and as such, claims 22, 30, and 38 are patentable over Johansson alone or in combination with Salonidis and Shah. Furthermore, dependent claims 23-29, 31-37, and 39-42 are similarly patentable over Johansson alone or in combination with Salonidis and Shah, not only by virtue of their dependency from patentable independent claims, respectively, but also by virtue of the additional features of the invention they define. Thus, the Applicants respectfully request that these rejections be reconsidered and withdrawn.

Moreover, the Applicants note that all claims are properly supported in the specification and accompanying drawings. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections.

III. Formal Matters and Conclusion

With respect to the rejections to the claims, the claims have been amended, above, to overcome these rejections. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections to the claims.

In view of the foregoing, Applicants submit that claims 22-42, all the claims presently pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the

Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary. Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 09-0441.

Respectfully submitted,

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